

CONFIGURATION UNCERTAINTY

[0001] The present invention relates to making transmissions in a communication system where there can be uncertainty at a receiving device about the configuration of a transmitting device

[0002] A communication device can be understood as a device provided with appropriate communication and control capabilities for enabling use thereof for communication with others parties. The communication may comprise, for example, communication of voice, electronic mail (email), text messages, data, multimedia and so on. A communication device typically enables a user of the device to receive and transmit communication via a communication system and can thus be used for accessing various service applications.

[0003] A communication system is a facility which facilitates the communication between two or more entities such as the communication devices, network entities and other nodes. A communication system may be provided by one or more interconnect networks. One or more gateway nodes may be provided for interconnecting various networks of the system. For example, a gateway node is typically provided between an access network and other communication networks, for example a core network and/or a data network.

[0004] An appropriate access system allows the communication device to access to the wider communication system. An access to the wider communications system may be provided by means of a fixed line or wireless communication interface, or a combination of these. Communication systems providing wireless access typically enable at least some mobility for the users thereof. Examples of these include wireless communications systems where the access is provided by means of an arrangement of cellular access networks. Other examples of wireless access technologies include different wireless local area networks (WLANs) and satellite based communication systems.

[0005] A wireless access system typically operates in accordance with a wireless standard and/or with a set of specifications which set out what the various elements of the system are permitted to do and how that should be achieved. For example, the standard or specification may define if the user, or more precisely user equipment, is provided with a circuit switched bearer or a packet switched bearer, or both. Communication protocols and/or parameters which should be used for the connection are also typically defined. For example, the manner in which communication should be implemented between the user equipment and the elements of the networks and their functions and responsibilities are typically defined by a predefined communication protocol. Such protocols and or parameters further define the frequency spectrum to be used by which part of the communications system, the transmission power to be used etc.

[0006] In the cellular systems a network entity in the form of a base station provides a node for communication with mobile devices in one or more cells or sectors. It is noted that in certain systems a base station is called 'Node B (NB)' or 'eNode B (eNB)'. Typically the operation of a base station apparatus and other apparatus of an access system required for the communication is controlled by a centralised control entity (which centralised control entity is typically interconnected with other centralised control entities of the particular communication network), or every base station (e.g. eNodeB) contains its own local control entity. Examples of cellular access systems include, in order of their evolution, GSM (Global System for Mobile) EDGE (Enhanced Data for GSM

Evolution) Radio Access Networks (GERAN), Universal Terrestrial Radio Access Networks (UTRAN) and evolved UTRAN (E-UTRAN).

[0007] In the Long Term Evolution (LTE) System Release 8, a device makes an uplink transmission according to a single carrier frequency division multiple access technique. Each uplink transmission is made using a group of orthogonal sub-carriers. Sub-carriers are grouped into units called resource blocks, and a device can make an uplink transmission using groups of resource blocks ranging up to a predetermined maximum number of resource blocks within a predetermined frequency block called a component carrier (CC). The bandwidth available for uplink transmissions generally comprises a plurality of CCs; and a device makes an uplink transmission on a selected one of the CCs. A further development of LTE Release 8 (which development is known as LTE-Advanced) provides for carrier aggregation, where two or more CCs are aggregated in order to support transmission bandwidths wider than that defined by a single CC. In summary, devices operating under LTE Release 8 are served by a single CC, whereas devices operating under LTE-Advanced can receive or transmit simultaneously on a plurality of CCs. This division of the spectrum into CCs and the aggregation of such CCs is illustrated in FIG. 9.

[0008] One technique of providing feedback information to an access node about transmissions received at the user equipment (UE) from the access node involves channel coding of this feedback information before transmission. It should be noted that channel coding can be realized by means of predetermined coding scheme (e.g., Reed-Muller) or alternatively by means of channel selection. According to one proposal, different numbers of code basis sequences (i.e. different codebook sizes) are used by the UE for encoding depending on the number of bits comprising the feedback information for one uplink (UL) subframe, which number of bits depends on the number of CCs configured, or in other words, enabled for transmission. It should be noted that the transmission to which the feedback information relates can use all configured CCs or any subset of the configured CCs. According to another proposal, different numbers of PUCCH Format 1b resources are used by the UE for transmission depending on the number of bits comprising the feedback information of one uplink (UL) subframe, which number of bits depends on the number of CCs for the transmission to which the feedback information relates.

[0009] There has been identified the challenge of correctly processing transmissions at a receiving device where there is some uncertainty at the receiving device about the configuration of the transmitting device.

[0010] More particularly, there has been identified the challenge of correctly processing coded feedback information at an access node in a carrier aggregation system at a time of change in the number of CCs configured for transmissions from the access node to the UE.

[0011] It is an aim to meet one or more of these challenges.

[0012] There is provided a method comprising: for an initial period after informing a receiving device of a change in the number of carriers configured for transmissions from a transmitting device to the receiving device from a first carrier set to a second carrier set, wherein at least one of the first and second carrier sets contains a plurality of carriers: refraining from scheduling data transmissions to said receiving device on one or more carriers other than those common to both said first and second carrier sets; and decoding feedback informa-